

REMARKS

Claims 1-8 were pending, all of which stand rejected. Claim 1 has been amended here and Claim 9 added.

Claims 1-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent publications Nos. 9-64421 and 6-177429.

In accordance with the present invention, see for instance, Fig. 1, the die (chip) 12 is contacted electrically by the leadframe on both its front side and its back side. The back side die contact is directly to the cup portion of the leadframe whereas the front side contact is via the leadframe contacts 18, which extend to the front side of the die. In other words, one side of the die in the disclosed embodiment, which is the back side, contains a drain terminal electrically connected to the leadframe by means of a layer of conductive epoxy whereas additionally, the remaining contacts to the gate terminal and source terminals, as shown in Fig. 2, at 24 and 26, are to the front side of the die. Thus this is a two surface contact leadframe. As stated at the top of page 4 of the application, "The package of this invention is economical to manufacture and provides electrical contacts to both sides of a dice."

As further expressed on page 4, "The broad principles of this invention are applicable to any semiconductor die which is to be packaged in such a way that the contact is made to both sides of the die, including integrated circuit (IC) dice that require a contact to the front side."

Claim 1 has been amended to overcome the rejection, and as amended recites "at least one lead of the leadframe containing a portion that is coplanar with the electrical terminal on the second side of the die, and the at least one lead being in electrical contact with the second electrical terminal". Clearly in combination with the earlier recitation in Claim 1 of "a leadframe in electrical contact with the first terminal" this makes it clear that there are contacts to both sides of the die, as explained above.

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Support for this amendment can be found, for example, in Fig. 1 of the drawings as originally filed, and at page 2, line 26, and page 3, line 11 of the specification. No new matter is added.

It is evident from Fig 1 of Japanese Patent Publication No. 9-177429, which is the new reference, that none of the leads in that reference contact the LED chip top side surface.

That is to say, the newly cited reference shows a die only contacted on one side.

It is noted that the earlier cited reference, which is Japanese Patent document No. 9-64421, does show a die contacted on both sides but clearly the upper lead wire (not designated in the figure but contacting terminals 7) is not "coplanar" with the top surface but extends well above the top surface. Hence it is not seen why even the combination of the newly cited reference and the earlier reference meets Claim 1 as amended which thereby distinguishes thereover.

It is pointed out that the Examiner has conceded that by itself Japanese Patent document 9-64421 does not meet Claim 1 as earlier amended. It is pointed out here that the further citation of Japanese Patent document 6-177429, showing a die contacted on only one side and without coplanar leads, fails to rectify the differences of Japanese Patent document 9-64421. Hence even in combination the two references fail to meet Claim 1 as amended.

To further claim the invention, new Claim 9 has been added, dependent upon Claim 1, and which further recites the configuration of the lead of the leadframe which contacts the top side of the die. The Claim 9 structure clearly is not shown in either reference. Note that Claim 9 recites "the portion of the one lead of the leadframe that is coplanar with the second side of the die extends laterally to be coplanar." This is shown in one embodiment in the top view of Fig. 3 and further defines the coplanarity. As stated above, Japanese Patent reference 9-64421 shows a wire lead arcing above and contacting the die and which thereby does not meet Claim 9. It is not seen where any such structure, as recited in Claim 9, is disclosed in

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Japanese Patent reference 9-64421. This reference merely shows the leadframe wire 34 which while does not extend "laterally" to be coplanar since it is descending down to the base 20. Hence Claim 9 additionally distinguishes over the references and is allowable for this additional reason.

Claims 2-9 depend from and further limit Claim 1 and all are therefore allowable over the references for at least the same reason.

The amendment to Claim 1 is shown in Appendix B.

Applicants respectfully submit that Claims 1-9 are allowable. Should the Examiner wish to discuss this case, he is invited to telephone the undersigned attorney for Applicants at (408) 453-9200.

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APPENDIX A - Changes to the Specification

The package of this invention is economical to manufacture and provides [a] electrical contacts to both sides of a dice. In addition, the direct connection between the die and the PCB provides a good thermal conduction path from the die to the PCB.

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APPENDIX B - Changes to Claim 1

1. (Amended) A semiconductor package comprising:

a semiconductor die having a first and second sides, a first electrical terminal being located on the first side, at least a second electrical terminal being located on the second side; and

a leadframe in electrical contact with the first terminal, the leadframe being formed in the shape of a cup, the die being located in the cup, at least one lead of the leadframe containing a portion that is coplanar with the second side of the die, and the at least one lead being in electrical contact with the second electrical terminal, the first side of the die facing in a direction toward the inside of the cup.

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